AIPMT 2006

1. The binding energy of deutron is 2.2 MeV and that of ^4_2He is 28 MeV. If two deutrons are fused to form one ^4_2He then the energy released is :

(1) 25.8 MeV (2) 23.6 MeV
(3) 19.2 MeV (4) 30.2 MeV

2. The radius of Germanium (Ge) nuclide is measured to be twice the radius of ^9_4Be. The number of nucleons in Ge are :-

(1) 73 (2) 74 (3) 75 (4) 72

3. In a radioactive material the activity at time t_1 is R_1 and at a later time t_2, it is R_2. If the decay constant of the material is λ, then :

(1) $R_1 = R_2 e^{-\lambda(t_1-t_2)}$ (2) $R_1 = R_2 e^{\lambda(t_1-t_2)}$
(3) $R_1 = R_2 (t_2/t_1)$ (4) $R_1 = R_2$

AIPMT 2007

4. If the nucleus $^{27}_{13}A\ell$ has a nuclear radius of about 3.6 fm, the $^{125}_{52}Te$ would have its radius approximately as :-

(1) 4.8 fm (2) 6.0 fm
(3) 9.6 fm (4) 12.0 fm

5. In radioactive decay process, the negatively charged emitted β - particles are :-

(1) the electrons orbiting around the nucleus
(2) the electrons present inside the nucleus
(3) the electrons produced as a result of the decay of neutrons inside the nucleus
(4) the electrons produced as a result of collisions between atoms

AIPMT 2009

6. The number of beta particles emitted by a radioactive substance is twice the number of alpha particles emitted by it. The resulting daughter is an-

(1) isotope of parent
(2) isobar of parent
(3) isomer of parent
(4) isotone of parent

7. In the nuclear decay given below :

$$^A_ZX \longrightarrow ^A_{Z+1}Y \longrightarrow ^{A-4}_{Z-1}B^* \longrightarrow ^{A-4}_{Z-1}B,$$

the particles emitted in the sequence are :-

(1) α, β, γ (2) β, α, γ (3) γ, β, α (4) β, γ, α

AIPMT (Pre) 2010

8. The mass of a ^7_3Li nucleus is 0.042 u less than the sum of the masses of all its nucleons. The binding energy per nucleon of ^7_3Li nucleus is nearly :-

(1) 23 MeV (2) 46 MeV
(3) 5.6 MeV (4) 3.9 MeV

9. The activity of a radioactive sample is measured as N_0 counts per minute at t = 0 and N_0/e counts per minute at t = 5 minutes. The time (in minutes) at which the activity reduces to half its value is :-

(1) $5 \log_e 2$ (2) $\log_e 2/5$
(3) $\frac{5}{\log_e 2}$ (4) $5 \log_{10} 2$

AIPMT (Mains) 2010

10. The binding energy per nucleon in deuterium and helium nuclei are 1.1 MeV and 7.0 MeV, respectively. When two deuterium nuclei fuse to form a helium nucleus the energy released in the fusion is :-

(1) 2.2 MeV (2) 28.0 MeV
(3) 30.2 MeV (4) 23.6 MeV

11. The decay constant of a radio isotope is λ. If A_1 and A_2 are its activities at times t_1 and t_2 respectively, the number of nuclei which have decayed during the time $(t_1 - t_2)$:-

(1) $A_1 - A_2$ (2) $(A_1 - A_2)/\lambda$
(3) $\lambda(A_1 - A_2)$ (4) $A_1t_1 - A_2t_2$

AIPMT (Pre) 2011

12. The power obtained in a reactor using U^{235} disintegration is 1000 kW. The mass decay of U^{235} per hour is :-

(1) 10 microgram (2) 20 microgram
(3) 40 microgram (4) 1 microgram

13. The half life of a radioactive isotope 'X' is 50 years. It decays to another element 'Y' which is stable. The two elements 'X' and 'Y' were found to be in the ratio of 1 : 15 in a sample of a given rock. The age of the rock was estimated to be :-

(1) 150 years (2) 200 years

(3) 250 years (4) 100 years

14. A nucleus ${}_{n}^{m}X$ emits one α particle and two β^- particles. The resulting nucleus is :-

(1) ${}_{n-4}^{m-6}Z$ (2) ${}_{n}^{m-6}Z$ (3) ${}_{n}^{m-4}X$ (4) ${}_{n-2}^{m-4}Y$

AIPMT (Mains) 2011

15. Two radioactive nuclei P and Q in a given sample decay into a stable nucleus R. At time t = 0, number of P species are $4\ N_0$ and that of Q are N_0. Half-life of P (for conversion to R) is 1 minute where as that of Q is 2 minutes. Initially there are no nuclei of R present in the sample. When number of nuclei of P and Q are equal, the number of nuclei of R present in the sample would be :-

(1) $2N_0$ (2) $3N_0$ (3) $\frac{9N_0}{2}$ (4) $\frac{5N_0}{2}$

AIPMT (Pre) 2012

16. If the nuclear radius of ^{27}Al is 3.6 Fermi, the approximate nuclear radius of ^{64}Cu in Fermi is :

(1) 4.8 (2) 3.6 (3) 2.4 (4) 1.2

17. A mixture consists of two radioactive materials A_1 and A_2 with half lives of 20 s and 10 s respectively. Initially the mixture has 40 g of A_1 and 160g of A_2. The active amount of the two in the mixture will becomes equal after :

(1) 20s (2) 40s

(3) 60s (4) 80s

AIPMT (Mains) 2012

18. The half life of a radioactive nucleus is 50 days. The time interval $(t_2 - t_1)$ between the time t_2 when 2/3 of it has decayed and the time t_1 when 1/3 of it had decayed is :-

(1) 60 days (2) 15 days

(3) 30 days (4) 50 days

NEET-UG 2013

19. A certain mass of Hydrogen is changed to Helium by the process of fusion. The mass defect in fusion reaction is 0.02866 u. The energy liberated per u is : (given 1u = 931 MeV)

(1) 13.35 MeV (2) 2.67 MeV

(3) 26.7 MeV (4) 6.675 MeV

20. The half life of a radioactive isotope 'X' is 20 years. It decays to another element 'Y' which is stable. The two elements 'X' and 'Y' were found to be in the ratio 1 : 7 in a sample of a given rock. The age of the rock is estimated to be:

(1) 100 years (2) 40 years

(3) 60 years (4) 80 years

AIPMT 2014

21. The Binding energy per nucleon of ${}_{3}^{7}Li$ and ${}_{2}^{4}He$ nuclei are 5.60 MeV and 7.06 MeV, respectively. In the nuclear reaction ${}_{3}^{7}Li + {}_{1}^{1}H \rightarrow 2\,{}_{2}^{4}He + Q$, the value of energy Q released is:-

(1) 19.6 MeV (2) –2.4 MeV

(3) 8.4 MeV (4) 17.3 MeV

22. A radio isotope 'X' with a half life 1.4×10^9 years decays to 'Y' which is stable. A sample of the rock from a cave was found to contain 'X' and 'Y' in the ratio 1 : 7. The age of the rock is :

(1) 1.96×10^9 years (2) 3.92×10^9 years

(3) 4.20×10^9 years (4) 8.40×10^9 years

AIPMT 2015

23. If radius of the ${}_{13}^{27}Al$ nucleus is taken to be R_{Al} then the radius of ${}_{53}^{125}Te$ nucleus is nearly :

(1) $\frac{5}{3}R_{Al}$ (2) $\frac{3}{5}R_{Al}$

(3) $\left(\frac{13}{53}\right)^{1/3}R_{Al}$ (4) $\left(\frac{53}{13}\right)^{1/3}R_{Al}$

RE-AIPMT 2015

24. A nucleus of uranium decays at rest into nuclei of Thorium and Helium. Then :-

(1) The Helium nucleus has less kinetic energy than the Thorium nucleus

(2) The Helium has more kinetic energy than the Thorium nucleus.

(3) The Helium nucleus has less momentum than the Thorium nucleus.

(4) The Helium nucleus has more momentum than the Thorium nucleus.

NEET-II 2016

25. The half-life of a radioactive substance is 30 minutes. The time (in minutes) taken between 40% decay and 85% decay of the same radioactive substance is :-

(1) 45 (2) 60 (3) 15 (4) 30

NEET(UG) 2017

26. Radioactive material 'A' has decay constant '8 λ' and material 'B' has decay constant 'λ'. Initially they have same number of nuclei. After what time, the ratio of number of nuclei of material 'B' to that 'A' will be e ?

(1) $\frac{1}{7\lambda}$ (2) $\frac{1}{8\lambda}$ (3) $\frac{1}{9\lambda}$ (4) $\frac{1}{\lambda}$

NEET(UG) 2018

27. For a radioactive material, half-life is 10 minutes. If initially there are 600 number of nuclei, the time taken (in minutes) for the disintegration of 450 nuclei is :-

(1) 20 (2) 10

(3) 30 (4) 15

NEET(UG) 2019

28. α-particle consists of :

(1) 2 protons and 2 neutrons only

(2) 2 electrons, 2 protons and 2 neutrons

(3) 2 electrons and 4 protons only

(4) 2 protons only

NEET(UG) 2019 (Odisha)

29. The rate of radioactive disintegration at an instant for a radioactive sample of half life 2.2×10^9 s is 10^{10} s^{-1}. The number of radioactive atoms in that sample at that instant is,

(1) 3.17×10^{20}

(2) 3.17×10^{17}

(3) 3.17×10^{18}

(4) 3.17×10^{19}

NEET(UG) 2020

30. When a uranium isotope $^{235}_{92}U$ is bombarded with a neutron, it generates $^{89}_{36}Kr$, three neutrons and:

(1) $^{103}_{36}Kr$ (2) $^{144}_{56}Ba$

(3) $^{91}_{40}Zr$ (4) $^{101}_{36}Kr$

31. The energy equivalent of 0.5 g of a substance is:

(1) 0.5×10^{13} J

(2) 4.5×10^{16} J

(3) 4.5×10^{13} J

(4) 1.5×10^{13} J

NEET(UG) 2020 (COVID-19)

32. What happens to the mass number and atomic number of an element when it emits γ-radiation?

(1) Mass number decreases by four and atomic number decreases by two.

(2) Mass number and atomic number remain unchanged.

(3) Mass number remains unchanged while atomic number decreases by one.

(4) Mass number increases by four and atomic number increases by two.

33. The half life of radioactive sample undergoing α-decay is 1.4×10^{17} s. If the number of nuclei in the sample is 2.0×10^{21}, the activity of the sample is nearly :

(1) 10^4 *Bq* (2) 10^5 *Bq*

(3) 10^6 *Bq* (4) 10^3 *Bq*

NEET(UG) 2021

34. A nucleus with mass number 240 breaks into two fragments each of mass number 120, the binding energy per nucleon of unfragmented nuclei is 7.6 MeV while that of fragments is 8.5 MeV. The total gain in the Binding Energy in the process is :

(1) 0.9 MeV (2) 9.4 MeV

(3) 804 MeV (4) 216 MeV

35. A radioactive nucleus ${}^{A}_{Z}X$ undergoes spontaneous decay in the sequence ${}^{A}_{Z}X \rightarrow {}_{Z-1}B \rightarrow {}_{Z-3}C \rightarrow {}_{Z-2}D$, where Z is the atomic number of element X. The possible decay particles in the sequence are :

(1) α, β^-, β^+ (2) α, β^+, β^-

(3) β^+, α, β^- (4) β^-, α, β^+

36. The half-life of a radioactive nuclide is 100 hours. The fraction of original activity that will remain after 150 hours would be :

(1) 1/2 (2) $\frac{1}{2\sqrt{2}}$

(3) $\frac{2}{3}$ (4) $\frac{2}{3\sqrt{2}}$

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**4**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**4**	**2**	**3**	**2**	**3**	**3**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**2**	**4**	**4**	**3**	**4**	**3**	**1**	**2**	**2**	**1**	**1**	**1**	**4**	**2**
Que.	31	32	33	34	35	36									
Ans.	**3**	**2**	**1**	**4**	**3**	**2**									